

REMARKS

The Examiner is thanked for the interview on December 6th, 2001. In the interview, several claim amendments were discussed. No agreement was made during the interview. In addition, the Examiner stated that any changes made to the claims may require a new search.

In the Office Action, the Examiner rejected claim 1-23 under 35 USC 102 and 103. These rejections are fully traversed below.

Claims 1 and 22 have been amended. Claims 24-46 have been added. Thus, claims 1-46 are pending in the application. Reconsideration of the application is respectfully requested based on the following remarks.

ISSUES UNDER 35 USC 102(b)

Claims 1-4, 6-7, 9, 20 and 23 have been rejected under 35 U.S.C. §102(b) as being anticipated by *Karaki* et al (5,130,965) or *Shikichi* et al (5,151,888).

Karaki discloses an optical apparatus for recording and reproducing information on a rotatable disc information recording medium having information tracks thereon in the rotational direction of the disc (e.g., compact disc).

Shikichi discloses an optical information processing apparatus that effects the recording and reproduction of information by scanning information tracks of an optical card by at least one condensed light beam while effecting tracking and/or focussing control.

In contrast to *Karaki* and *Shikichi*, claim 1 specifically requires, "...a light detector arrangement including individual light detectors that correspond to individual ones of a plurality of transmitted light beams caused by the intersection of the plurality of light beams with the surface of the substrate, the light detectors being arranged for sensing the light intensity of the transmitted light." While *Karaki* and *Shikichi* may disclose the use of multiple beams, *Karaki*

and *Shikichi* do not teach or suggest anything related to transmitted light. In *Karaki*, the apparatus includes an optical detector for detecting the reflected light of the beams, which have been reflected from the information recording medium. In *Shikichi*, the apparatus includes optical sensors for receiving the light of the light beams reflected from an optical card. Both *Karaki* and *Shikichi* are silent to transmitted light. In fact, it would be highly unlikely for *Karaki* and *Shikichi* to ever use transmitted light because of the art to which they are involved. Each of the mediums (e.g., compact discs, optical cards) include reflective surfaces for reading information therefrom (see for example, Col. 2, line 32-43 in *Shikichi*). If the reflective surfaces were not included, the mediums would no longer function.

Therefore, for at least the reasons above, it is respectfully submitted that the art of record (*Karaki* or *Shikichi*) neither discloses nor reasonably suggests the invention as recited in claim 1 and thus the rejection is unsupported by the art and should be withdrawn.

With regards to claims 2-4, 6-7, 9, and 20, these claims are dependents of claim 1 and therefore should be withdrawn for at least the reasons given above.

With regards to claim 23, the rejection is believed to be improper. Contrary to the examiner's statement that both *Karaki* and *Shikichi* teach what is claimed in claim 23, the element, "each of the scanning spots having a specified overlap and separation with respect to one another that is controlled by the grating spacing and the rotation of the diffraction grating about the optical axis," is not, and therefore the rejection is unsupported by the art and should be withdrawn. The Examiner is respectfully requested to make a showing of such a feature to maintain the rejection. No such showing was made in the outstanding Office Action.

Claims 1-17, 20, and 22 have been rejected under 35 U.S.C. §102(e) as being anticipated by *Vaez-Iravani* (6,208,411).

Vaez-Iravani discloses an inspection and imaging system that employs a plurality of simultaneously focused beams to illuminate a specimen such as semiconductor wafer.

In contrast to *Vaez-Iravani*, claim 1 specifically requires, "...a light detector arrangement including individual light detectors that correspond to individual ones of a plurality of

transmitted light beams caused by the intersection of the plurality of light beams with the surface of the substrate, the light detectors being arranged for sensing the light intensity of the transmitted light.” While *Vaez-Iravani* may disclose the use of multiple beams, *Vaez-Iravani* does not teach or suggest anything related to transmitted light. In *Vaez-Iravani*, the apparatus includes a detector for detecting light that is reflected from the illuminated specimen. No mention is made to using transmitted light and thus the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Vaez-Iravani*, claim 22 specifically requires, “...comparing the scan signals with a predetermined reference signal to determine characteristics about the surface of the substrate.” Again, while *Vaez-Iravani* may disclose the use of multiple beams, *Vaez-Iravani* does not teach or suggest comparing detected signals to a reference signal. No mention is made to making a comparison and thus the rejection is unsupported by the art and should be withdrawn.

ISSUES UNDER 35 USC 103(a)

Claims 18, 19, 21 and 23 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Vaez-Iravani* (6,208,411).

With regards to claims 18, 19 and 21, these claims are dependents of claim 1 and therefore should be withdrawn for at least the reasons given above.

With regards to claim 23, the Examiner gives no reason as to why this claim should be rejected. In the Office Action, the Examiner grouped claims 21 and 23 together and made statements with respect to claim 21 and failed to make any statements with respect to claim 23. As stated in MPEP 2142, “...the examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...” Accordingly, the Examiner is respectfully urged to provide evidence to maintain the rejection. It should also be noted that the mere fact that a reference can be modified does not render the claim obvious unless the prior art also suggests the desirability of modifying.

Claims 1-23 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Sanada* et al (6,084,716) in view of *Vaez-Iravani* or *Shikichi* et al or *Karaki* et al.

Sanada discloses an optical substrate inspection apparatus for inspecting masks, reticles or wafers using multi-beam laser light. The apparatus may be modified for selectively detecting the reflected and transmitted light, which is reflected by and transmitted through a substrate, separately or simultaneously.

Sanada and *Vaez-Iravani*

With regards to all the claims 1-23, the undersigned respectfully disagrees with the Examiners addition of *Vaez-Iravani* to *Sanada*. That is, it is believed that one of ordinary skill in the art would not be motivated to combine *Vaez-Iravani* with *Sanada*. This is due in part to the fact that *Vaez-Iravani* teaches away from *Sanada*.

Sanada teaches multi pin holes 103 and 111 (see Fig. 2 and Cols. 10 & 11).

In contrast to *Sanada*, *Vaez-Iravani* states in the background, “In both these systems an array of pinholes is utilized both with and without an accompanying lens array in front of an extended source of light to generate a plurality of point sources. These point sources are then brought into focus on the sample by the action of an objective lens. The reflected beams are directed back through the same pin hole array, or another matching array of pinholes. One drawback of such an approach is that the illumination position and collection pin holes must be precisely matched over the entire array...A further problem with the identical illumination/pinhole array arrangement is the possibility of stray light that may find its way onto unintended detector pixels...Yet another consideration that pertains to these references is the fact that they rely on a precise action of the micro lens/pinhole structures to generate high quality beams for each individual focal spot... (Col. 1, line 62 to Col. 2, line 54).”

In lieu of the comments above, the Examiner is respectfully urged to remove the rejection, which combines *Vaez-Iravani* with *Sanada*.

Sanada and *Shikichi* or *Karaki*

With regards to claims 1 and 22, the undersigned respectfully disagrees with the Examiners addition of *Shikichi* or *Karaki* to *Sanada*. That is, it is believed that one of ordinary skill in the art would not be motivated to combine *Shikichi* or *Karaki* with *Sanada*. This is due in part to the fact that the intended function of *Shikichi* or *Karaki* would be destroyed by combining it with *Sanada*. As should be appreciated, the CCPA and the Federal Circuit have consistently held that when a 103 rejection is based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, such a proposed modification is not proper and the prima facie case of obviousness can not be properly made. An example of such an evaluation is *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Claim 1 specifically requires, "...a light detector arrangement including individual light detectors that correspond to individual ones of a plurality of transmitted light beams caused by the intersection of the plurality of light beams with the surface of the substrate, the light detectors being arranged for sensing the light intensity of the transmitted light."

With regards to claim 1, the combination of *Shikich* to *Sanada* destroys the function of the invention disclosed in *Shikichi*. In particular, *Shikichi* would not function as intended by using transmitted light. *Shikichi* uses reflectance to detect tracks of information. If light was transmitted through the optical card then the intended function of detecting information via reflectance would be destroyed. To further this point, the optical card includes a recording layer having tracks, which contain recorded information that is optically detected via their reflectance. In order to use transmitted light, the recording layer would have to have transparent portions, which would adversely effect the tracking of tracks, the recording of pit rows, reproducing of pit rows and the like (see Col. 2, lines 33-43). In essence, *Shikichi* teaches away from using transmitted light.

Karaki has similar problems as *Shikichi*. *Karaki* is directed towards compact discs that include a reflective surface for reading information therefrom. If the reflective surface had transparent portions then the information on the compact disc would not be able to be read. For example, the tracking beams would not be able to follow the track and thus the recording and reproducing beam would be lost.

Claim 22 specifically requires, "...sweeping the plurality of beams so as to move the plurality of spatially distinct spots along the surface of the substrate in a second direction..."

With regards to claim 22, the combination of *Shikich* to *Sanada* destroys the function of the invention disclosed in *Shikichi*. In particular, *Shikichi* would not function as intended by sweeping a plurality of beams. In *Shikichi*, at least some of the beams are used for maintaining the position of the beams along a track as the optical card is moved (e.g. tracking). If the tracking beams were swept, then their intended function of maintaining a position along the track would be destroyed. In essence, *Shikichi* teaches away from sweeping beams.

Karaki has the same problems (e.g., tracking beams).

With regards to claim 23, neither reference teaches or suggests, "each of the scanning spots having a specified overlap and separation with respect to one another that is controlled by the grating spacing and the rotation of the diffraction grating about the optical axis," as required by claim 23. Therefore the rejection is unsupported by the art and should be withdrawn. The Examiner is respectfully requested to make a showing of such a feature to maintain the rejection. No such showing was made in the outstanding Office Action.

With regards to claims 2-21, these claims are dependents of claim 1 and therefore should be withdrawn for at least the reasons given above.

DOUBLE PATENTING

Claims 1-23 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-20 of copending Application No. 09/636, 129.

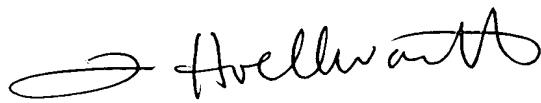
Once the conflicting claims have become patented, the Applicant will consider filing a terminal disclaimer in accordance with 37 CFR 1.321(c).

SUMMARY

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,

BEYER WEAVER & THOMAS, LLP

A handwritten signature in black ink, appearing to read "Hoellwarth", with a large, stylized initial "Q" or "H" at the beginning.

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APPENDIX

1. (Once Amended) An optical inspection system for inspecting the surface of a substrate, comprising:

a light source for emitting an incident light beam along an optical axis;

a first set of optical elements arranged for separating the incident light beam into a plurality of light beams, directing the plurality of light beams to intersect with the surface of the substrate, focusing the plurality of light beams to a plurality of scanning spots on the surface of the substrate; and

a light detector arrangement including individual light detectors that correspond to individual ones of a plurality of **[reflected or]** transmitted light beams caused by the intersection of the plurality of light beams with the surface of the substrate, the light detectors being arranged for sensing the light intensity of **[either]** the **[reflected or]** transmitted light.

22. (Once Amended) A method of inspecting a surface of a substrate, comprising:

transporting the substrate in a first direction;

providing a first light beam;

separating the first light beam into a plurality of light beams;

focusing the plurality of light beams to a plurality of spatially distinct spots on the surface of the substrate;

sweeping the plurality of light beams so as to move the plurality of spatially distinct spots along the surface of the substrate in a second direction;

detecting the intensity of each of the plurality of light beams after their intersection with the surface of the substrate; **[and]**

generating a plurality of scan signals corresponding to the detected plurality of light beams~~[.];~~ **and**

comparing the scan signals with a predetermined reference signal to determine characteristics about the surface of the substrate.